



Rio Grande National Forest | 2022

A Change in Scenery: Spruce Beetles on the Rio Grande National Forest

A Change in Scenery

Many folks visiting the Rio Grande National Forest notice the stands and mountain sides of dead trees. More than 617,000 acres of spruce-fir forest have been infested by spruce beetles since the 1990s on the Rio Grande National Forest. The native spruce beetle primarily attacks mature Engelmann spruce, although it sometimes infests blue spruce too. The tiny beetle kills trees over 5 inches in diameter. Luckily, smaller spruce and all sizes of subalpine fir have survived. They will provide the foundation for the next forest.



Photo: William M. Ciesla

How do beetles kill trees?

Although spruce beetles are smaller than a grain of rice, they can kill spruce trees that are over 100 feet tall. These tiny beetles are a bark beetle that bores into the cambium and phloem layers of the trees, which are located under the bark. The adults then create galleries where they deposit their eggs. Once the eggs hatch, the larvae bore around the tree eating the phloem and cambium layers. When populations are high enough, the

cumulative effect of all the larvae eating the cambium and phloem disrupts the flow of sugars and nutrients causing the tree to die.

What can be done?

There is nothing that humans can do to stop a landscape-level spruce beetle epidemic. The beetle infestation was too widespread and their populations too large to be able to use forest management techniques to stop them. Aerial spraying is not an option for bark beetle control because the bark protects the beetles from pesticides. Although humans cannot stop the spread of spruce beetles, the Rio Grande National Forest harvests dead and dying trees in accessible areas open to forest management. Funds generated through the sale of timber allows the Forest Service to purchase seedlings and plant them in areas with little natural regeneration in an effort to jumpstart the natural cycle.

Natural Disturbance

It's difficult for most folks to watch our forests go through this big change. Some describe the spruce beetle epidemic as 'heart wrenching,' 'terrible,' and 'very sad.' There are also people who blame the Forest Service for the epidemic, while others blame environmentalists. Neither is true. We are witnessing a natural event. This is what forests do occasionally. Spruce beetles are always present in the forest, but under normal conditions their populations stay relatively low. When drought conditions exist, trees become stressed and cannot produce a normal quantity of

sap. The beetles attack the weakened trees without being pushed out by sap. Local beetle populations exploded during a dry period starting in 2000, overwhelming the trees' defenses.



*Wolf Creek Pass with spruce beetle-kill, 2020.
Photo: Colorado State Forest Service*

Disturbances come in all shapes and sizes in forests – everything from a single tree blowing down to the landscape-level spruce beetle epidemic. Disturbances are important in nature as they create a mosaic of different communities, which support diverse types of life. These communities tend to change over time and, if no other disturbances occur, will eventually reach a somewhat “stable” climax community.

Don't let the beetles eat away your activity plans. Through understanding the importance of natural disturbances, you may be able to look beyond the millions of dead trees and instead appreciate the beauty of nature's rhythm of change.

Play it safe.

Safety is a concern in the beetle-killed forests because dead trees eventually fall. Although spruce trees may stand for decades after they die, many have blown down. There are a number of factors that affect the risk of trees falling, such as soil type, soil moisture, topography, and wind. In some situations, green, living trees may be more

susceptible to blowing down than the dead trees because their needles catch more wind. It is difficult to predict when specific trees will fall, so it is highly recommended that people take extra precautions when visiting beetle-killed forests.

Precautions include:

- Do not hike, ride, or drive in beetle-killed forests on windy days.
- Do not park or set up a tent near tall trees in a beetle-killed forest.
- Carry a saw or an axe when driving on roads or trails that go through beetle-killed forest. It is always a possibility a tree will fall and block your way home while you are up the road or trail.

Fire danger

The large number of dead trees in the forest may lead people to believe that there is an increased chance of a severe wildland fire. A closer look reveals that is probably not the case. Large fires are somewhat rare in the high elevation subalpine forest where Engelmann spruce and subalpine fir grow. Some research indicates that there is no difference in the chance of a wildland fire starting in a green or beetle-killed subalpine forest.

Different fuel arrangements complicate how wildfires burn in areas with beetle-killed trees. Initially, when the dry, dead needles of beetle-infested trees are still on the branches, there may be an increased risk of fire burning through the tops of the trees. When the needles fall off the trees, they quickly absorb moisture from the ground and decompose within a few years. In dry conditions, the fallen needles may help carry a ground fire, but the tops of standing bare trees are less likely to carry a crown fire than those of living trees. Once the trees fall to the ground, a fire burning through the area may burn very hot and damage the soils, but the risk of a fire starting is no greater than when the trees were still alive.